AN INVESTIGATION OF PRE-SELECTED SPRINGS AND SEEPAGES FOR ADDITIONAL POPULATIONS OF THE DESERT SLENDER SALAMANDER, BATRACHOSEPS ARIDUS, IN THE SANTA ROSA MOUNTAINS, RIVERSIDE COUNTY, CALIFORNIA

by

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for

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ABSTRACT

A field search for the desert slender salamander (Batrachoseps aridus) was conducted at 34 potential habitat sites in the Santa Rosa Mountains, Riverside County, California during winter 1980-81. An additional population of Batrachoseps was discovered during this study in Guadelupe Canyon. Taxonomic analysis is necessary to determine the similarity of this population to other slender salamander species present in the general area.

INTRODUCTION

The desert slender salamander, Batrachoseps aridus, was discovered in 1969 in the south fork of Hidden Palms Canyon, a tributary of Deep Canyon in the Santa Rosa Mountains. It was described during 1970 (Brame 1970), and subsequently placed on both the State of California and Federal endangered species lists.

The habitat of the salamander at this location is restricted to a minimum of 41.4 square meters and is dependent on seepage from groundwater originating on 440 acres of watershed above the site (Bleich, unpubl.). A portion of the habitat was destroyed by floodwaters in 1976. Attempts to locate other populations of B. aridus remained unsuccessful. A wildlife habitat management plan was developed for the Santa Rosa Mountains in 1980 by the U. S. Department of the Interior and the California Department of Fish and Game. It recognized the need for a comprehensive survey to determine whether other populations of this salamander were in existence and initiated the study herein reported.

The field work for this investigation was carried out from December 1980 through February 1981.

Potential salamander habitats were selected from wildlife water source lists and inspection of infrared aerial photographs and marked on topographic maps supplied by the Bureau of Land Management. Particular attention was given toward selecting survey sites with characteristics conducive to long-term salamander survival. Selection criteria for sites included presence of riparian vegetation or other indicator of permanent water, extent of large rock masses, and amount of protection from excessive sunlight. An examination of the habitat characteristics of the only known Batrachoseps aridus population and past experience with a similar relictual species of disjunct distribution, the Invo slender salamander (B. campi), also aided in evaluation of other prospective localities.

Field procedure consisted of locating and examining these sites during daylight hours, and conducting specimen searches at night. Information obtained was as follows: 1) rate of water flow from seeps &/or springs; 2) water and ambient temperatures at 6PM; 3) overnight minimum ambient temperature; 4) vegetation description; and 5) panorama photographs.

From observations at the type locality and analysis of figures given in Bleich (unpubl.) the optimum time to observe active salamanders in winter is between the hours of 6PM and 8PM. Searches with a headlamp generally started immediately after the 6PM temperatures had been recorded, and were carried out by systematically examining rock crevices, damp debris, and loose rocks in seepage areas from one end of a site to the other and back again.

Wildlife Water Source Sites identified on Map #5 of the Santa

Rosa Mountains Wildlife Habitat Management Plan, 1980, were labeled with corresponding numbers to reduce confusion. Other sites were similarly assigned numbers corresponding to nearby Wildlife Water Sources. Table 1 of the Appendix lists the sites by number, together with name (if any), map location, and elevation. One site, Aqua Bonita Spring, which is two miles from the nearest numbered water source, was not given an identification number. The habitat parameters measured at each site are presented in Table 2.

RESULTS

Habitat suitable for Batrachoseps proved to be exceedingly scarce in the Santa Rosa Mountains. Of over 70 spring and seep sites identified, only 34 were judged to have a high-enough potential to warrant a nighttime search. Of these, only Site 45 in Guadelupe Canyon approached the habitat quality of the type locality for Batrachoseps aridis.

Only a single population of slender salamanders was discovered. This occurred at Site 45 on February 19, 1981. This site is dominated by a northeast-facing granite wall two to three hundred feet high over which the canyon runoff waters cascade. Salamanders were also observed a short distance upstream from the top of the falls; however, the main population appears to be concentrated on a portion of the canyon wall which contains seepages trickling through an array of boulders and crevices beside the falls. This section of the wall, comprising one to two thousand square feet, is further moistened by spray from the waterfall which strikes a nearby ledge. Heavy deposits of damp soil among the ledges, boulders and crevices support a profusion of grasses and other small

plant life which provide habitat for insects, the salamander prey-base.

DISCUSSION

Desert populations of slender salamanders appear to require the presence of year-round moist conditions. B. campi in the Inyo Mountains (Giuliani, unpubl.) and B. aridus in the Santa Rosa Mountains occur in the vicinity of permanent seeps emanating from large rock masses. Such places have provided relatively stable refuges during the thousands of years of climatic changes.

Although scouring from occasional massive flash-flooding can destroy some of the habitat and individuals in isolated populations, drying of springs and seeps is most disastrous to a salamander population. Many sites which lacked adequate moisture contained evidence of past vigorous seepages in the form of calcareous sheets overlying dry rock faces. These deposits greatly enhance the habitat for Batrachoseps as long as the seeps remain active.

The new locality is of greater extent and stability than the type locality for Batrachoseps aridus, and management need only concern itself with maintaining uninterrupted and pollution-free water output from the aquifer. However, additional inventories will be needed of this site to evaluate extent of the population distribution in the canyon drainage, estimate population size, and determine by electrophoretic analysis, the degree of genetic similarity to the Hidden Palms Canyon population.

SUMMARY

Since its discovery in 1969 the desert slender salamander

(Batrachoseps aridus) has been known from a single restricted location in the Santa Rosa Mountains. Additional suitable salamander habitat is very rare in these mountains, and three months of searching potential habitat has disclosed only one new population of Batrachoseps. This contrasts greatly with B. campi, which was found in nearly every canyon of the Inyo Mountains during a similar field search conducted for the BLM during 1976.

Although the lack of finding specimens at any field site must always be considered inconclusive, the evidence now suggests that Batrachoseps is represented in the Santa Rosa Mountains by only two disjunct highly localized populations.

LITERATURE CITED

Brame, A.H. 1970. A new species of Batrachoseps (slender salamander) from the desert of Southern California. Los Angeles Co. Mus. Contr. Sci. No. 200.

Table 1. Site designation, location and elevation.

Site	Water Source Name (if any)	Location	Elev.(ft.)
2	Carrizo Spring	NE¼ Sec.24, T6S, R5E	2400
3B		NE¼ Sec.19, T6S, R6E	1400
3C		NE¼ Sec.19, T6S, R6E	2100
4A		SE¼ Sec.19, T6S, R6E	1300
4B		SE¼ Sec.19, T6S, R6E	1400
4C		SE¼ Sec.19, T6S, R6E	1500
4D		SE¼ Sec.19, T6S, R6E	1600
5A	Hidden Palm Canyon	NW¼ Sec.30, T6S, R6E	2600
6	Deep Canyon	NW¼ Sec. 6, T7S, R6E	2900
6A		NW¼ Sec.31, T6S, R6E	2700
6B		NW¼ Sec. 6, T7S, R6E	3100
6C		NE¼ Sec.12, T7S, R5E	3300
7	Tahquitz Spring	SE¼ Sec. 1, T8S, R6E	2600
7A		SW¼ Sec. 1, T8S, R6E	2700
9	South Fork Spring	SE¼ Sec.17, T8S, R7E	2750
10	Sumac	SW¼ Sec.11, T8S, R7E	1450
18	Bear Creek Spring	NW¼ Sec.26, T6S, R6E	1200
21	Wentworth Spring	NW¼ Sec.13, T5S, R4E	1100
21A		NE¼ Sec.13, T5S, R4E	1200
22	Palm Canyon Spring	NW¼ Sec.25, T5S, R4E	1500
27	Magnesia Spring	SE¼ Sec.14, T5S, R5E	700
28	Upper Magnesia	NW¼ Sec.23, T5S, R5E	900
28A		NE¼ Sec.22, T5S, R5E	1000
29	Upper Cat Canyon	SW¼ Sec.27, T5S, R5E	2200
37	Lower Carrizo Spring	SW¼ Sec. 7, T6S, R6E	1300
44A		SE¼ Sec. 2, T7S, R6E	2500
44B		SE¼ Sec. 2, T7S, R6E	2700

44C		SE¼ Sec. 2, T7S, R6E	2800
45	Upper Guadalupe Spring	NW¼ Sec.11, T7S, R6E	3200
49	Upper Agua Alta Spring	NW¼ Sec.25, T7S, R6E	2900
51A		SW¼ Sec.30, T7S, R6E	2200
59	Cougar	NE¼ Sec.28, T8S, R7E	4200
63		SW¼ Sec.13, T5S, R4E	1000
A.B.	Aqua Bonita Spring	NE¼ Sec.12, T6S, R4E	2700

Table.2. Habitat parameters of the sites.

Site	Date	6PM temp. C water	air	Min. air C	Flow, GPM	Riparian Vegetation
2	18 Dec.80	19	14	15	--	SBCGM
3B	9 Jan.81	16	17	16	--	WBG
3C	19 Jan.81	14½	16	12	--	WBGFM
4A	10 Jan.81	14	19	16	--	BGFM
4B	10 Jan.81	12	18	16	--	GM
4C	10 Jan.81	17	17	16	1	GM
4D	10 Jan.81	12½	16	16	--	GFM
5A	12 Jan.81	19	15	--	1	WBGFM
6	13 Jan.81	10	13	8	--	BFM
6A	14 Jan.81	13½	13	8½	--	PRBGM
6B	15 Jan.81	15	12	6½	--	BG
6C	17 Jan.81	11½	13	4	--	BVGFM
7	23 Jan.81	16	16	10	--	BGFM
7A	22 Jan.81	20	15½	14	--	PBG
9	24 Jan.81	19	10½	7	20	SRBCGF
10	25 Feb.81	17	12½	7	--	PSRBCGFM
18	24 Feb.81	15½	14½	--	--	PBGFM
21	6 Dec.80	21	15	6	15	WPSBGFM
21A	7 Dec.80	20	15	11	7½	WPSBGFM
22	8 Dec.80	--	11	9	--	WBGM
27	10 Dec.80	15	20	14	--	M
28	12 Dec.80	13	20	--	2½	WBC
28A	11 Dec.80	17	21	18	4	WBGM
29	13 Dec.80	13	12	11	4	WSBGFM
37	8 Jan.81	16	20	14½	--	BGM
44A	19 Feb.81	14	23	16	--	WRBG
44B	18 Feb.81	11	20	16	--	SRBM

44C	18	Feb.81	17½	20	16	½	PSRBGFM
45	19	Feb.81	12	--	--	2	BVGM
49	21	Jan.81	14	17	11	--	BFM
51A	20	Jan.81	20	16	14	12	PRFG
59	25	Jan.81	6½	12	8	0	BM
63	9	Dec.80	24	15	11	--	W
A.B.	15	Dec.80	10	22	10	2½	WPSRBVGFM
T.L.*	16	Jan.81	11-15½	14	--	--	WPSRBGFM

*Type Locality, entered for comparison.

Key. W--Palm (Washingtonia filifera)

P--Mesquite (Prosopis sp.)

S--Willow (Salix sp.)

R--Sugarbush (Rhus ovata)

B--Waterweed (Baccharis sergilioides)

F--Common reed (Phragmites communis)

C--Cat-tail (Typha sp.)

V--Grapevine (Vitis sp.)

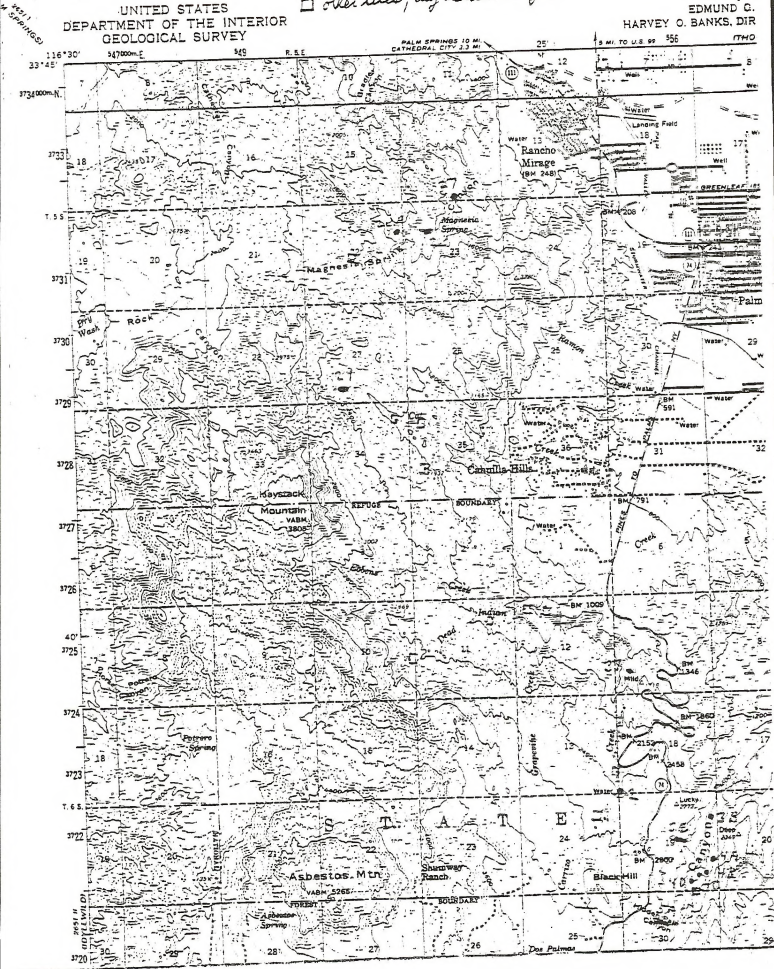
G--Grasses

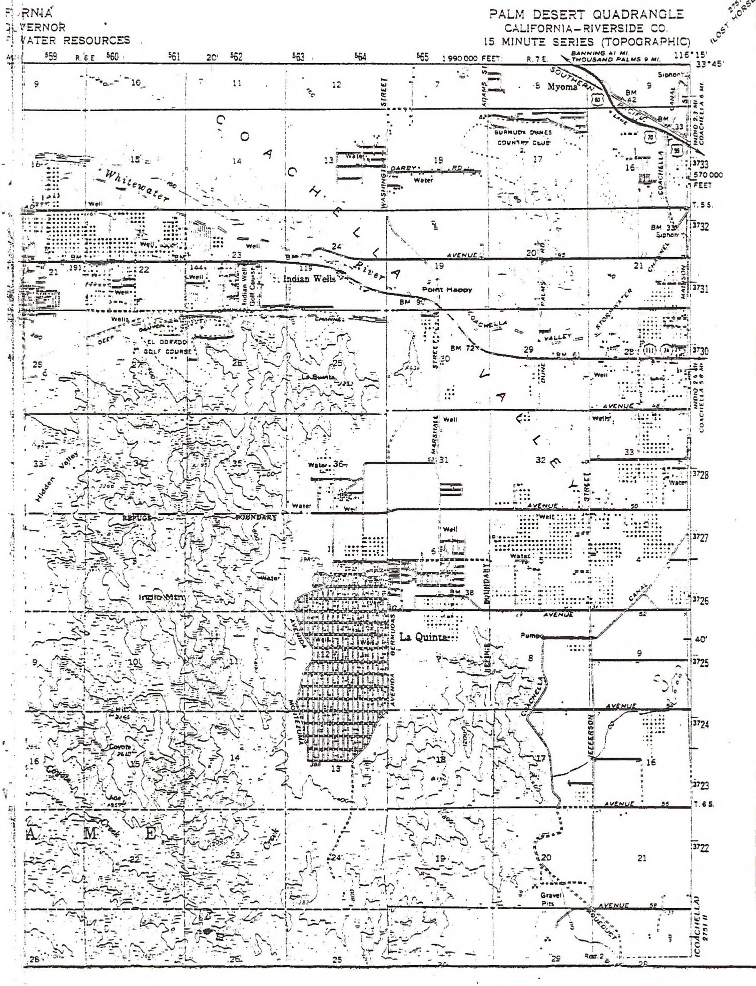
F--Fern

M--Moss

● numbered sites searched after dark.

□ other sites, day-checked only.

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